VS.SYSTEM™

VS SYSTEM - UPRIGHT TYPE

MODEL NO: MDS-UP-US

OPERATION MANUAL

Nintendo®

WARNING

This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

WARNING

Use of non-Nintendo parts or modifications of your Nintendo game circuitry may adversely affect the safety of your game, and may cause injury to your players.

TABLE OF CONTENTS

WARNING

Check before plugging the game in.

I. LOCATION SETUP

VS. System — Upright is shipped ready for operation. Please check the following to insure proper operation.

(1) Check the exterior of the game for shipping damage, dents, chips, or broken parts.
(2) Remove the screws on the rear door panel.
(3) Unlock and open the rear door panel, as well as the service door, and inspect the interior of the game as follows:

a) **Check that all the plug-in connectors are firmly connected.**
b) **Check all main subassemblies (monitor, power supply, control panel, etc.) to ensure they are securely mounted.**

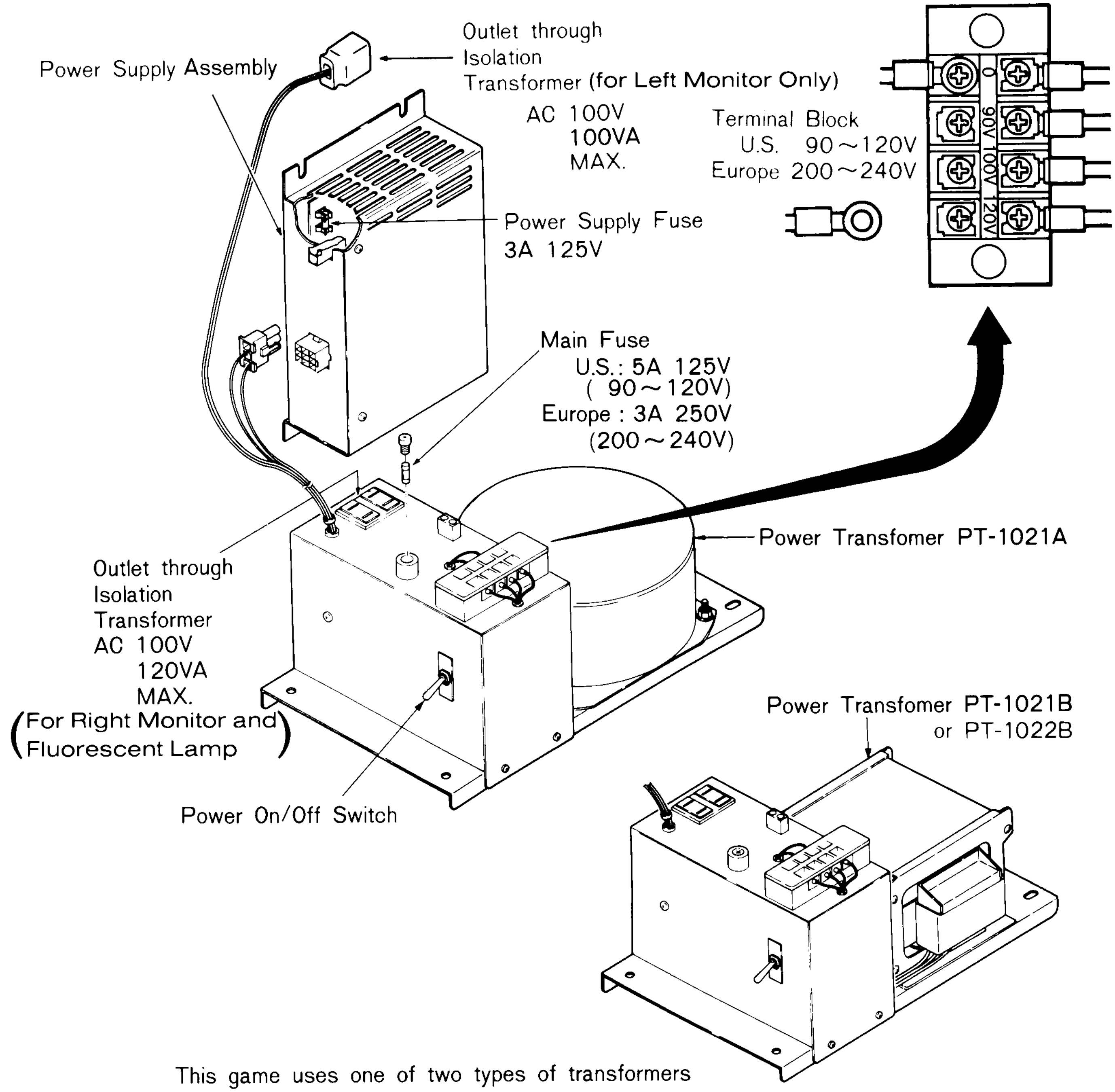
A. Game installation

(1) Requirements

Amperage:	1.8 AMPS
Temperature:	0 to 38 degrees Celsius (32 to 100 degrees Fahrenheit)
Humidity:	Not over 95% relative
Space required:	42¼" x 33½"
Height:	68¼"

B. Voltage selection

Before plugging in your game, make sure the terminal block of the power transformer is correct for your location's line voltage. See figure 1.



This game uses one of two types of transformers which are different in appearance but identical in function. The two types can be interchanged.

Fig. 1 Power Supply Assembly, Power Transformer and Voltage Selection

C. Power on/off switch

A power on/off switch is located in the rear of the game at the bottom left of the cabinet.

WARNING

Please be sure you use a grounded outlet for this game. Failure to do so may result in destruction of electronic components.

D. Grounding of Game (Use only if 3 wire outlet is unavailable.) See Fig. 2

(1) A grounding wire should be connected to a grounding bar or a metal pipe which is firmly inserted into the ground.

(2) Do not connect the grounding to a water pipe, because polyvinyl-chloride pipes are sometimes used in water lines, and the electronic continuity to the ground may be interrupted.

(3) Absolutely do not connect the grounding wire to a gas pipe, as this can be extremely dangerous.

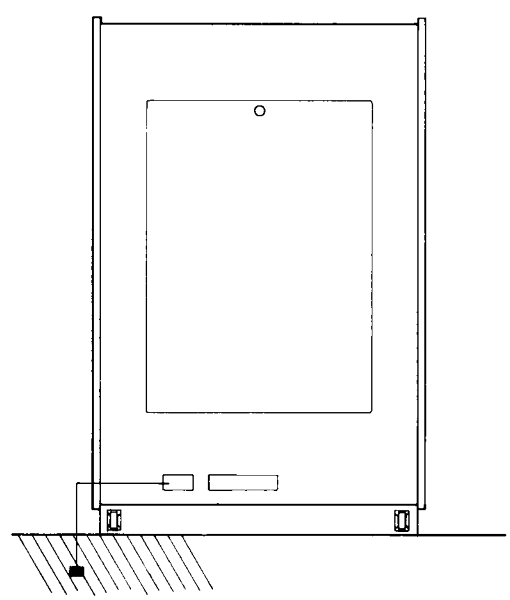


Fig. 2

II. ADJUSTMENT

A. Adjustment of Video Monitor

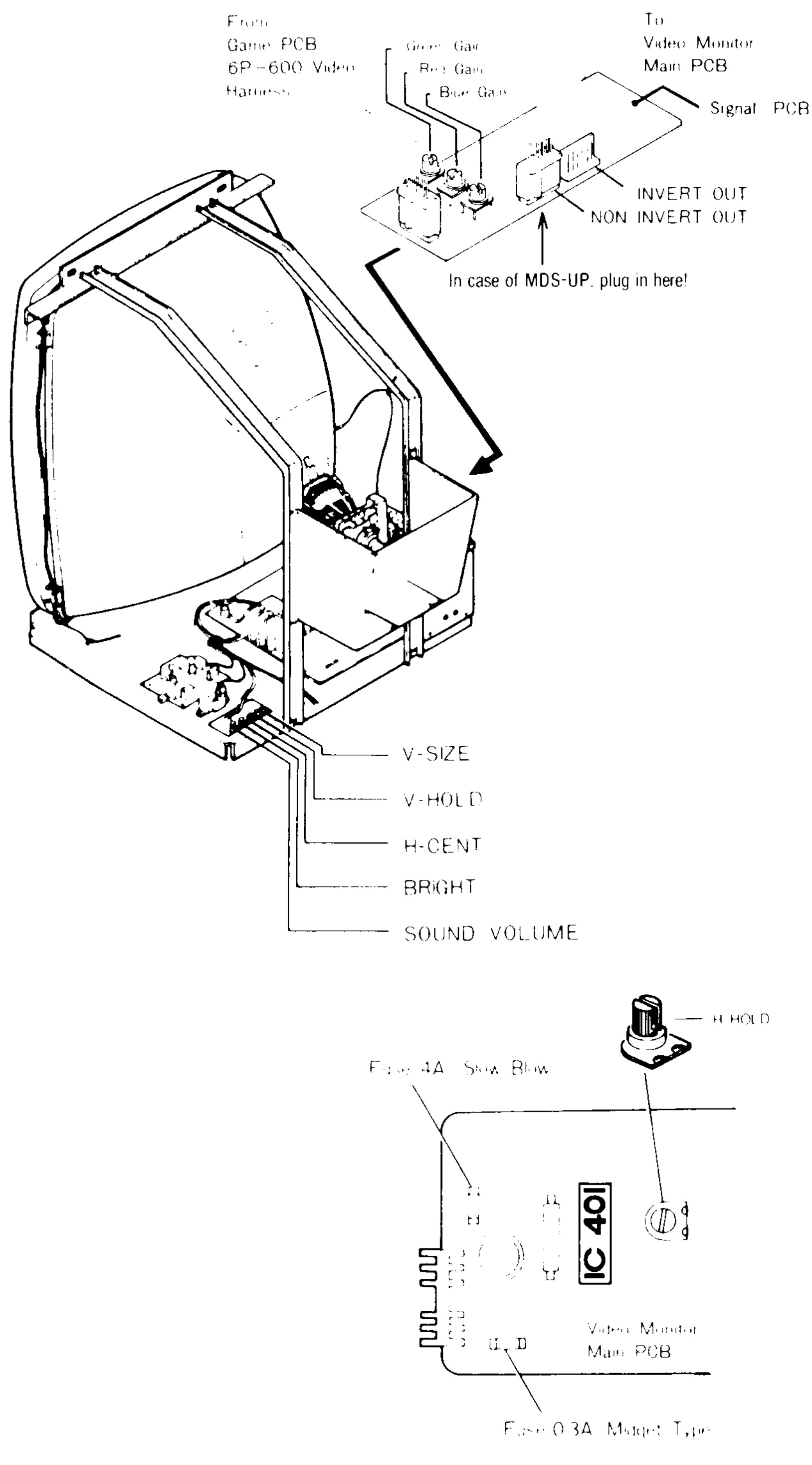
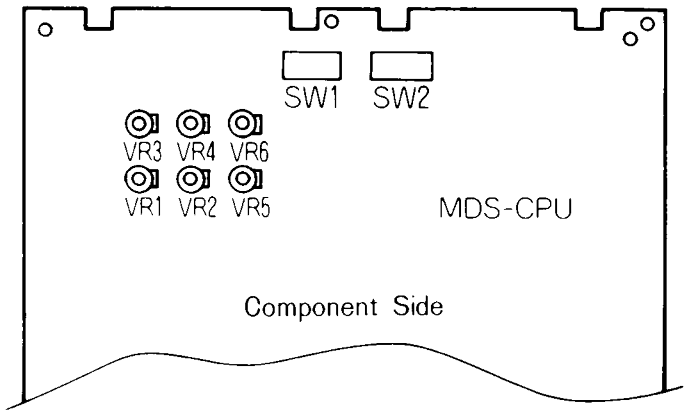


Fig. 3 Video Monitor

WARNING

Do not touch the inside of the Video Monitor.
It contains many parts supplied with high voltage.

MDS P.C. Board



Cautions: (1) Since the Dip Switch settings (SW1, SW2) may be changed by new game software, refer to the new game instructions attached.

(2) Do not touch the fixed variable resistors (VR1, VR2, VR3, VR4, VR5, and VR6), as they have already been preset and do not need adjustment.

III. MAINTENANCE AND REPAIR

A. Fuse Replacements

This game contains 4 fuses. Replace fuses only with the same type as listed below.

Specification of Fuses

(1) Main Fuse	U.S. :	5A 125V (90~120V)
	Europe :	3A 250V (200~240V)
(2) Power Supply Fuse		3A 125V MIDGET
(3) Video Monitor Fuse		4A 125V
		0.3A 125V MIDGET

B. Cleaning

The exterior of the game, all metal parts and all glass parts can be cleaned with a nonabrasive cleanser.

C. Operation Panel

(1) Operation Panel Removal
Before repairing or replacing any switches or 8 way Controllers on the Operation Panel, unplug the game. Open the Service Door, and reach through the opening, and unlock the Clamps, located at each end on the underside of the Operation Panel.

(2) Micro-switch Replacement
Whenever you replace any micro-switch on the Operation Panel, a switch gap adjustment is needed as shown in Fig. 4. This adjustment is not necessary for the player option buttons.

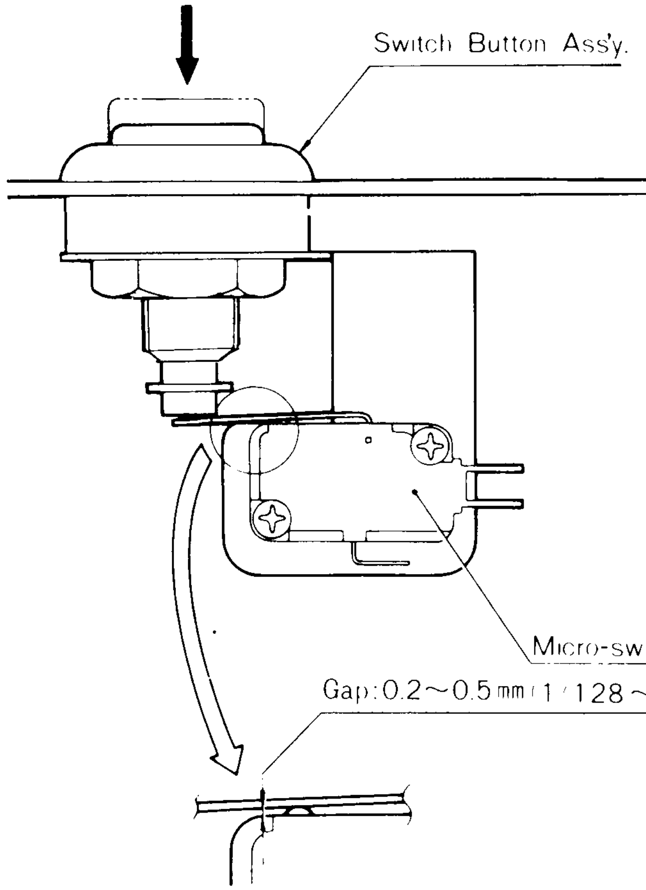


Fig. 4 Switch gap adjustment

(3) Lubrication for 8 way Controller

To maintain the 8 way Controller in good condition, lubricate the ball socket and 8 way Guide Plate approx. every 3 months. See Fig. 5.

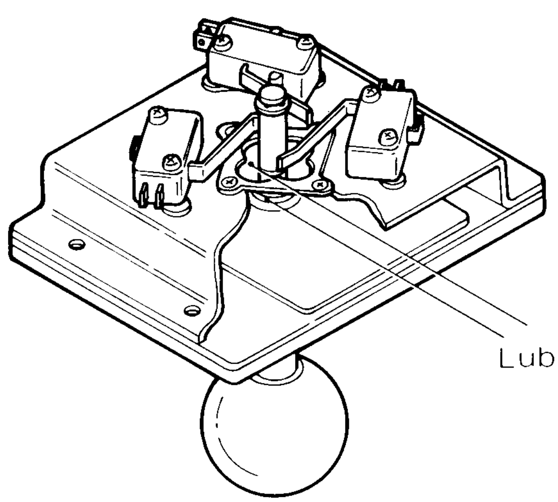


Fig. 5 Lubrication points

D. Front Screen and Video Monitor Removal

(1) Front Screen Removal

To remove the Front Screens, first remove the Control Panels by reaching through the Service Doors and releasing the Control Panel Clasps. Pull the bottom of the Front Screen toward you allowing it to drop into the slots. Then pull out toward center of game. See Fig. 6

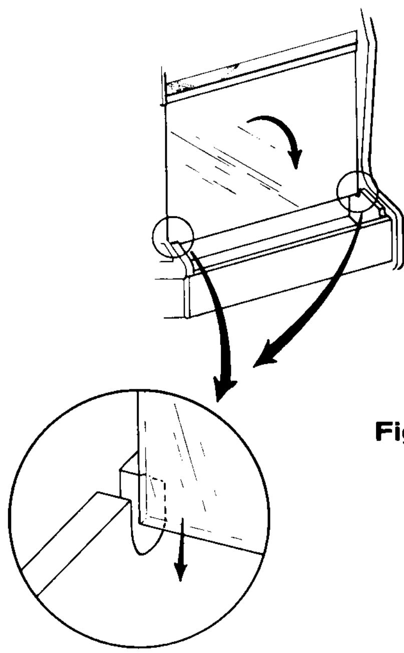


Fig. 6

(2) Video Monitor Removal

If you need to remove the Video Monitor, follow the instructions listed below. But the following procedure should only be performed by an experienced service technician.

WARNING

It is recommended the game be left unplugged for at least one hour before removing the Video Monitor. This will probably discharge the CRT, but extreme caution is still necessary.

(a) Make sure game is unplugged.
(b) Remove back door and unplug all the harnesses and cables from the Video Monitor.
(c) Standing at the front opening of the game, remove the four mounting machine screws and flat washers. See Fig. 7.
(d) Carefully lift the Video Monitor and pull out toward you.

WARNING

Use extreme caution and do not touch electrical parts of the yoke area with your hands or with any metal object in your hands.

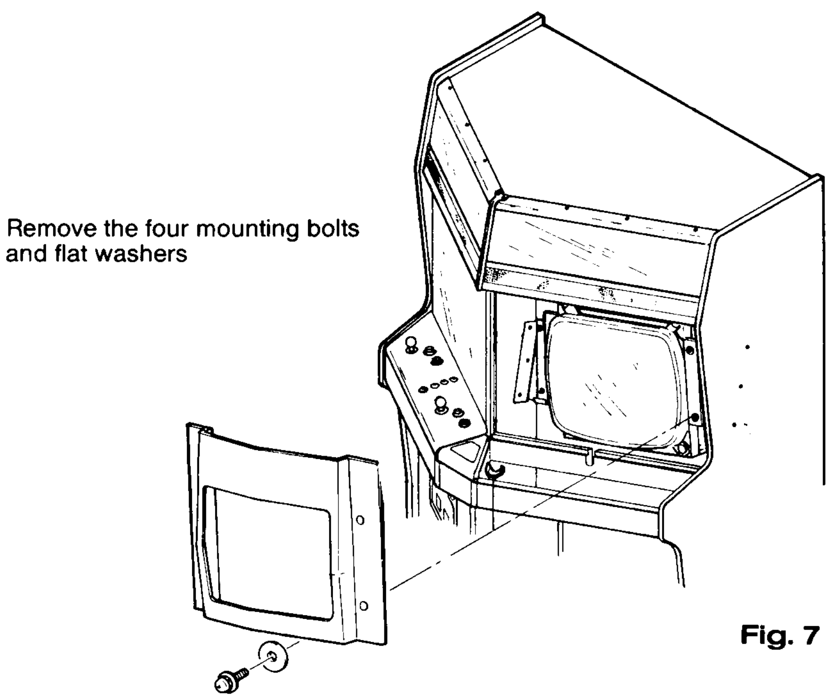


Fig. 7

E. Game PCB Removal

(1) Make sure the game is unplugged!!
(2) Open the rear door panel.
(3) Remove the 36 pin and 44 pin edge connectors from the right side of the FCC-PCBs on the shield cover.
(4) Pull out the 6 fasteners located on the perimeter of the shield cover. See Fig. 8
(5) Remove the 44 pin and 36 pin FCC short harnesses from the game P.C. board.
(6) Remove the game PCB from the shield cage by carefully sliding it straight out of the wooden PCB guides.

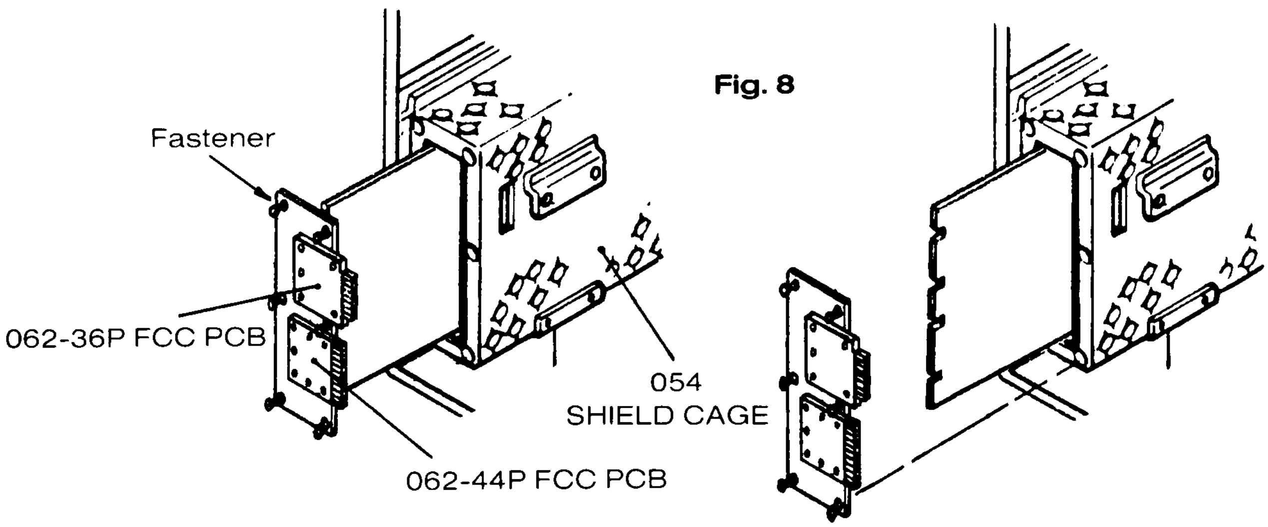


Fig. 8

> **WARNING**
>
> **A reversed connector will damage your PCB! If the connectors don't slip on easily, don't force them!**

IV. RADIO FREQUENCY INTERFERENCE

In order to protect against the RFI radiated from this equipment, please comply with the following.

(A) Do not use non-Nintendo parts!
(B) Do not modify your game circuitry!
(C) Do not modify the wiring harness and connections!
(D) Connect this game only to a grounded 3-wire outlet.
(E) After servicing the Game PCB, shut the Shield Cover completely with the Fasteners. See Fig. 8.

WIRING DIAGRAM

SCALE
DATE 3 10 84
APPROVED BY
DRAWN BY M. [signature]
REVISED

062 FCC PC Board

Nintendo of America Inc.

DRAWING NUMBER

MDS PCB

062 44P FCC HARNESS

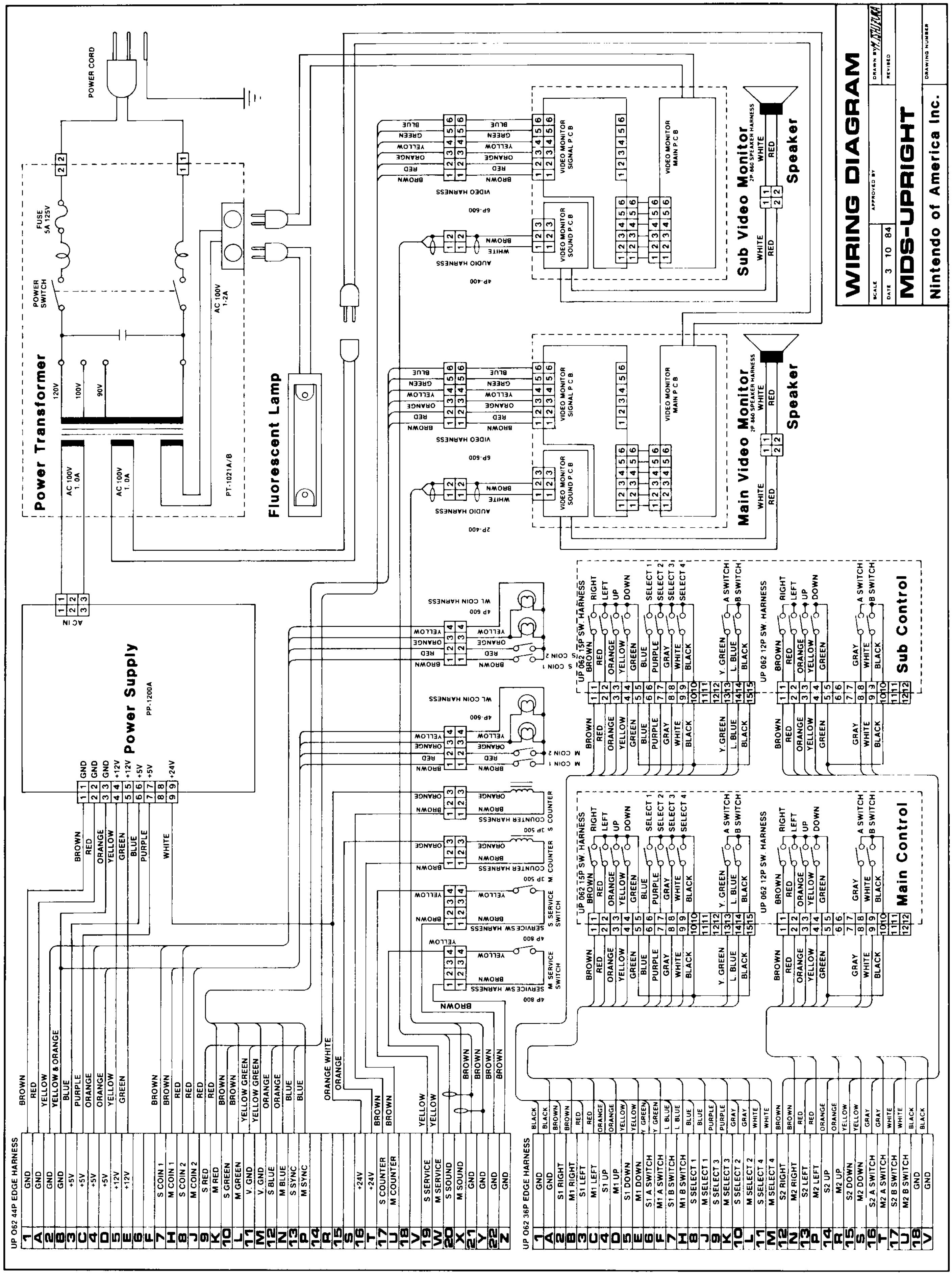
062 44P FCC PCB — 44P Edge Harness Connector

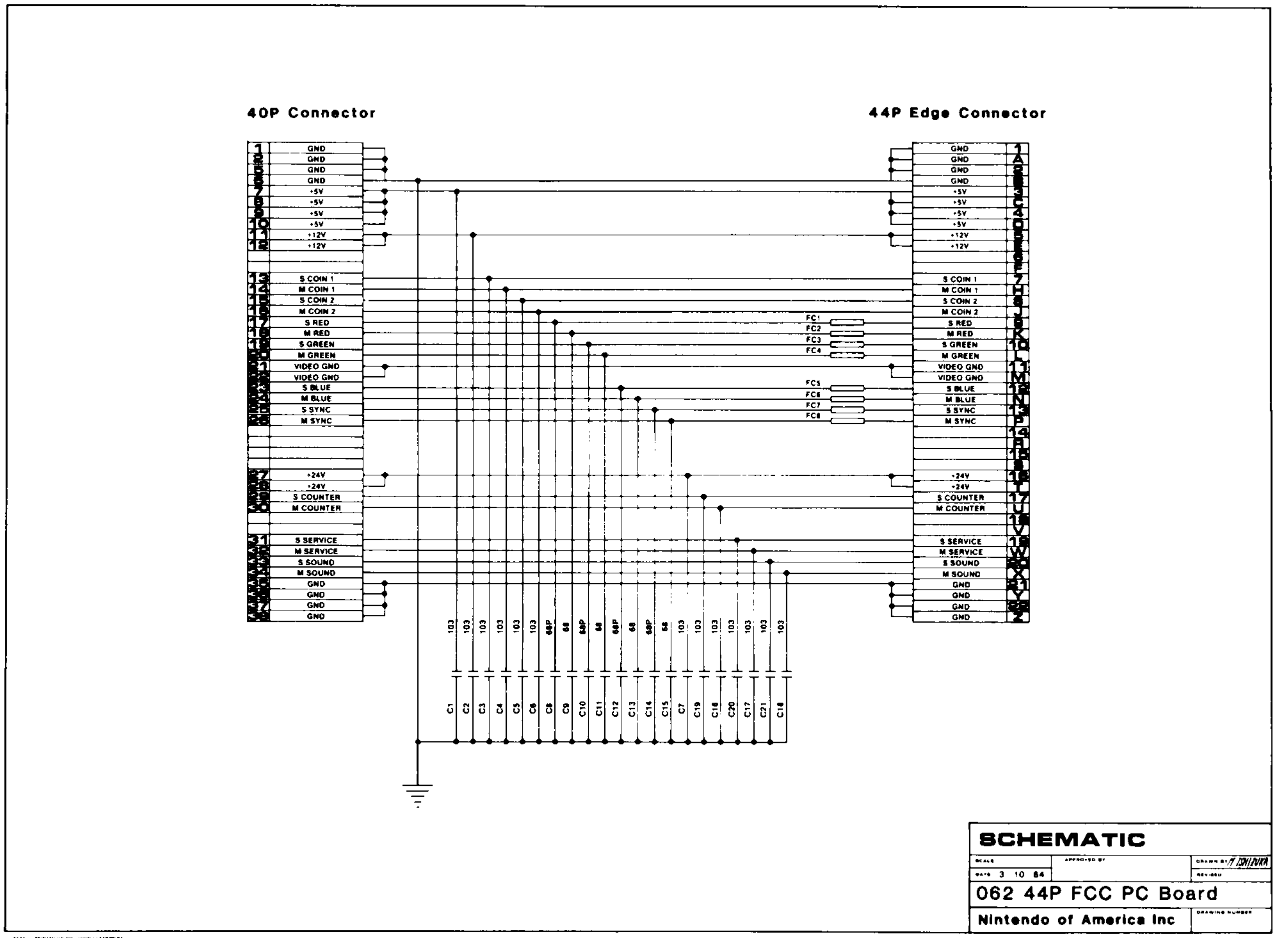
MDS PCB pin	Signal	Wire color	FCC pin	FCC pin	44P Edge connector
1	GND	BLACK	1	1	1
A	GND	BLACK	2	2	A
2	GND	BLACK	5	5	2
B	GND	BLACK	6	6	B
3	+5V	RED	7	7	3
C	+5V	RED	8	8	C
4	+5V	RED	9	9	4
D	+5V	RED	10	10	D
5	+12V	ORANGE	11	11	5
E	+12V	ORANGE	12	12	E
6					6
F					F
7	S COIN 1	BROWN	13	13	7
H	M COIN 1	BROWN	14	14	H
8	S COIN 2	RED	15	15	8
J	M COIN 2	RED	16	16	J
9	S RED	RED	17	17	9
K	M RED	RED	18	18	K
10	S GREEN	BROWN	19	19	10
L	M GREEN	BROWN	20	20	L
11	V. GND	YELLOW	21	21	11
M	V. GND	YELLOW	22	22	M
12	S BLUE	ORANGE	23	23	12
N	M BLUE	ORANGE	24	24	N
13	S SYNC	BLUE	25	25	13
P	M SYNC	BLUE	26	26	P
14					14
R					R
15					15
S					S
16	+24V	ORANGE	27	27	16
T	+24V	ORANGE	28	28	T
U	M COUNTER	BROWN	29	29	17
17	S COUNTER	BROWN	30	30	U
18					18
V					V
W	M SERVICE	YELLOW	31	31	19
19	S SERVICE	YELLOW	32	32	W
X	M SOUND		33	33	20
20	S SOUND		34	34	X
21	GND	BROWN	35	35	21
Y	GND	BROWN	36	36	Y
22	GND	BLACK	37	37	22
Z	GND	BLACK	38	38	Z

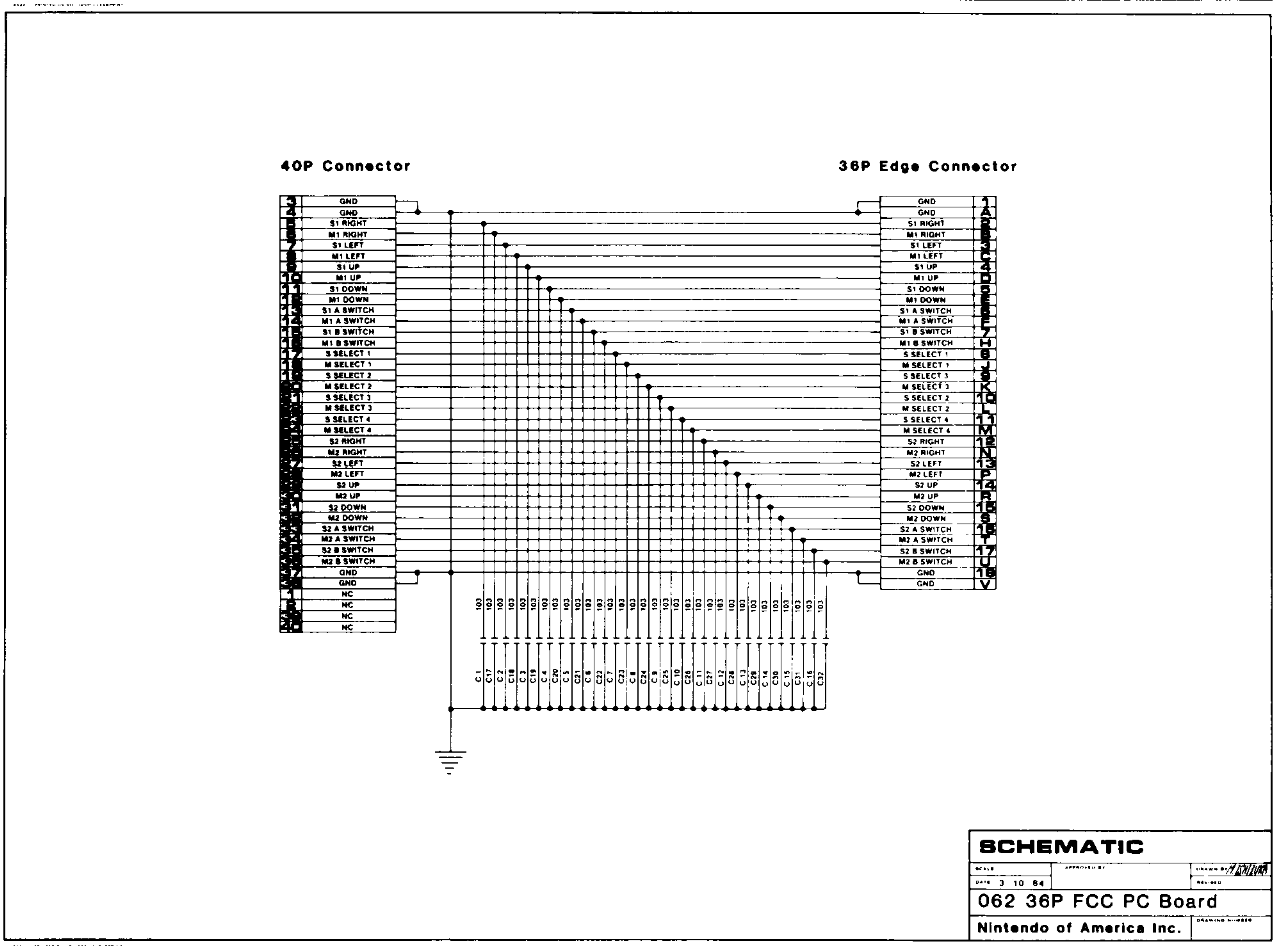
062 36P FCC HARNESS

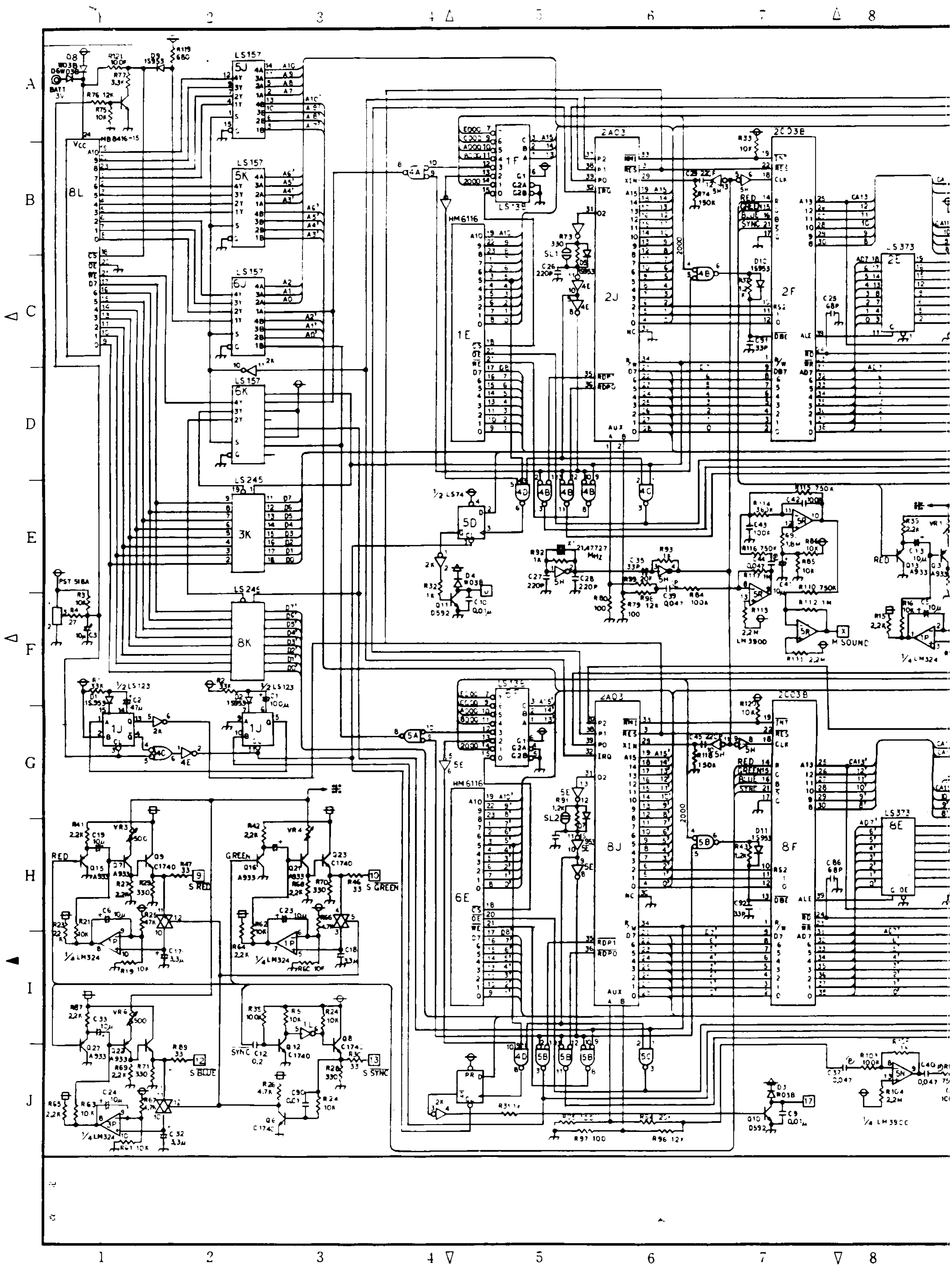
062 36P FCC PCB — 36P Edge Harness Connector

MDS PCB pin	Signal	Wire color	FCC pin	FCC pin	36P Edge connector
1	GND	BLACK	3	3	1
A	GND	BLACK	4	4	A
2	S1 RIGHT	BROWN	5	5	2
B	M1 RIGHT	BROWN	6	6	B
3	S1 LEFT	RED	7	7	3
C	M1 LEFT	RED	8	8	C
4	S1 UP	ORANGE	9	9	4
D	M1 UP	ORANGE	10	10	D
5	S1 DOWN	YELLOW	11	11	5
E	M1 DOWN	YELLOW	12	12	E
6	S1 A SWITCH	YELLOW GREEN	13	13	6
F	M1 A SWITCH	YELLOW GREEN	14	14	F
7	S1 B SWITCH	LIGHT BLUE	15	15	7
H	M1 B SWITCH	LIGHT BLUE	16	16	H
8	S SELECT 1	BLUE	17	17	8
J	M SELECT 1	BLUE	18	18	J
9	S SELECT 2	PURPLE	19	19	9
K	M SELECT 2	PURPLE	20	20	K
10	S SELECT 3	GRAY	21	21	10
L	M SELECT 3	GRAY	22	22	L
11	S SELECT 4	WHITE	23	23	11
M	M SELECT 4	WHITE	24	24	M
12	S2 RIGHT	BROWN	25	25	12
N	M2 RIGHT	BROWN	26	26	N
13	S2 LEFT	RED	27	27	13
P	M2 LEFT	RED	28	28	P
14	S2 UP	ORANGE	29	29	14
R	M2 UP	ORANGE	30	30	R
15	S2 DOWN	YELLOW	31	31	15
S	M2 DOWN	YELLOW	32	32	S
16	S2 A SWITCH	GRAY	33	33	16
T	M2 A SWITCH	GRAY	34	34	T
17	S2 B SWITCH	WHITE	35	35	17
U	M2 B SWITCH	WHITE	36	36	U
18	GND	BLACK	37	37	18
V	GND	BLACK	38	38	V

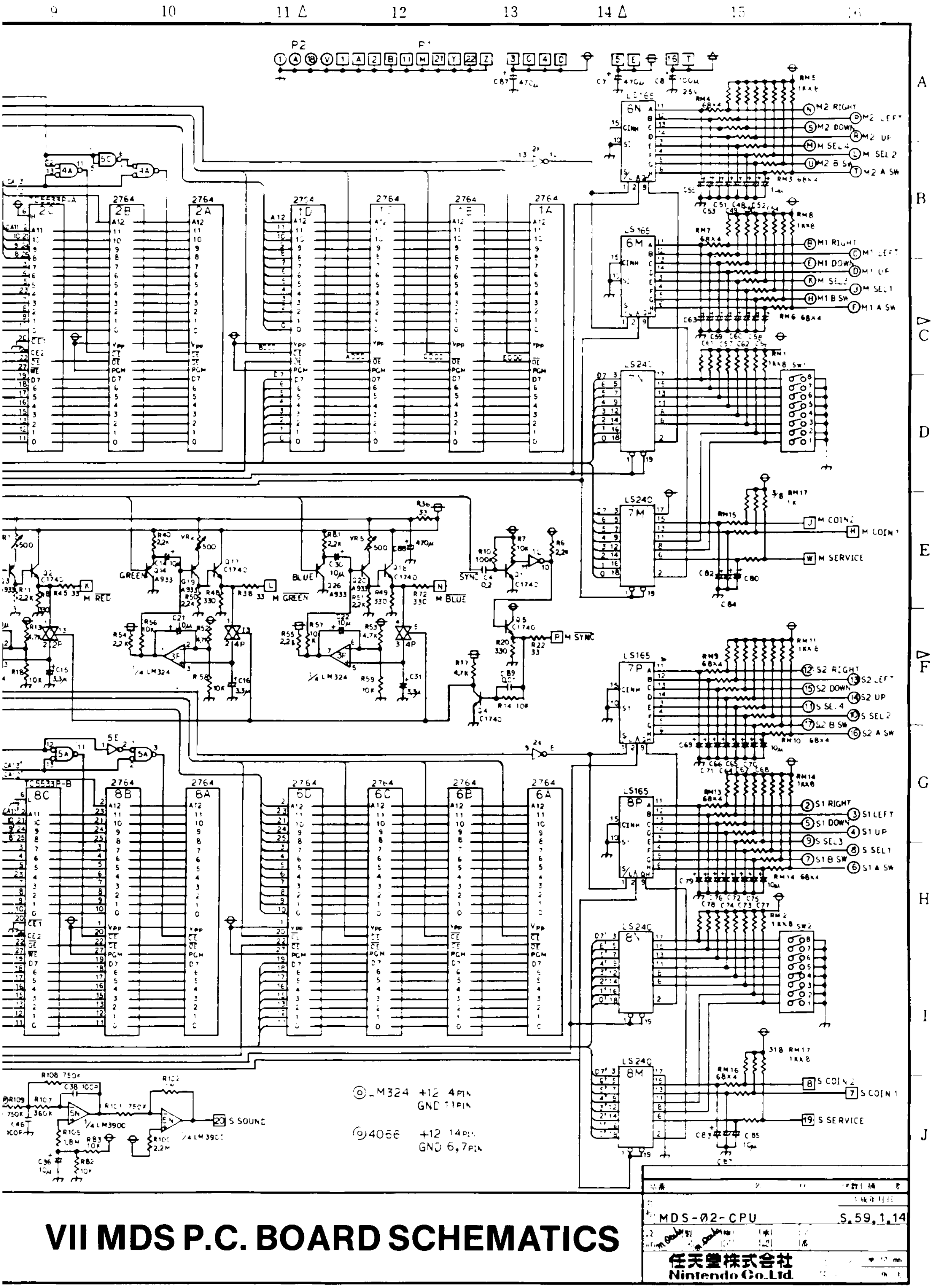

WIRING DIAGRAM
MDS-UPRIGHT
Nintendo of America Inc.
DATE 3 10 84
Power Transformer
PT-1021A/B
Fluorescent Lamp
Power Supply
PP-1200A
Sub Video Monitor
Main Video Monitor
Speaker
Sub Control
Main Control
POWER CORD
FUSE 5A 125V
POWER SWITCH
UP 062 44P EDGE HARNESS
UP 062 36P EDGE HARNESS

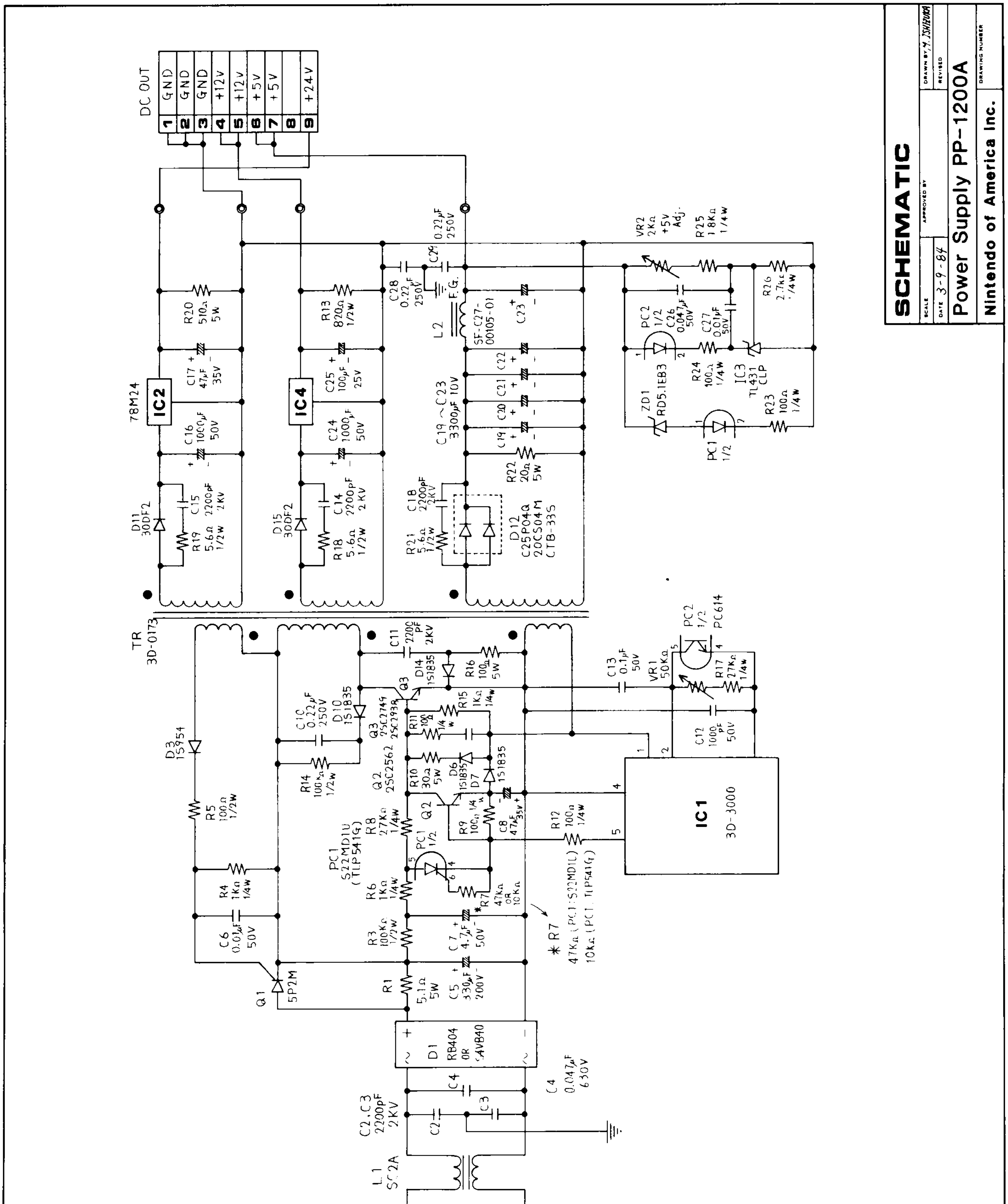

40P Connector
44P Edge Connector
SCHEMATIC
DATE 3 10 84
062 44P FCC PC Board
Nintendo of America Inc


40P Connector
36P Edge Connector
SCHEMATIC
DATE 3 10 84
062 36P FCC PC Board
Nintendo of America Inc.

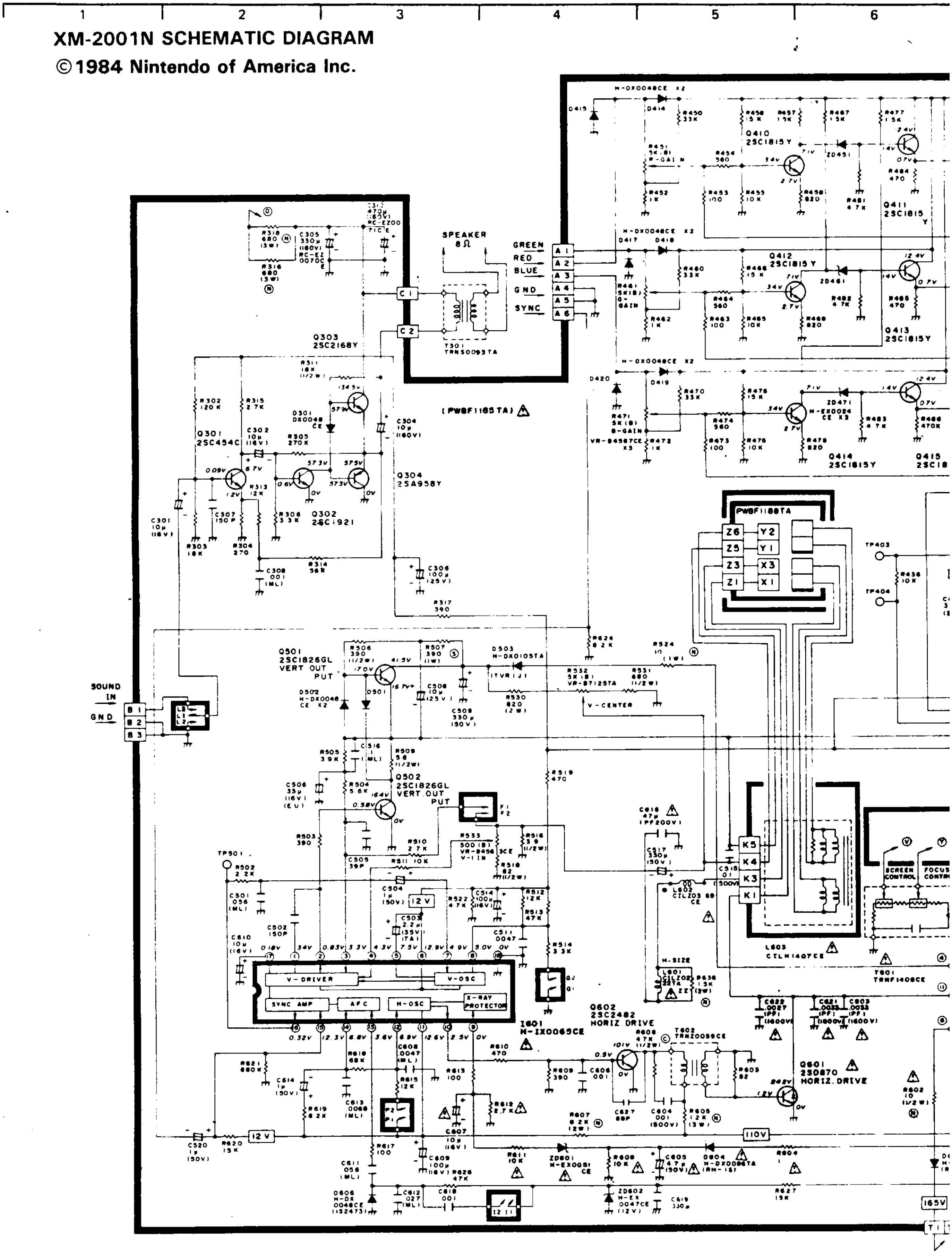


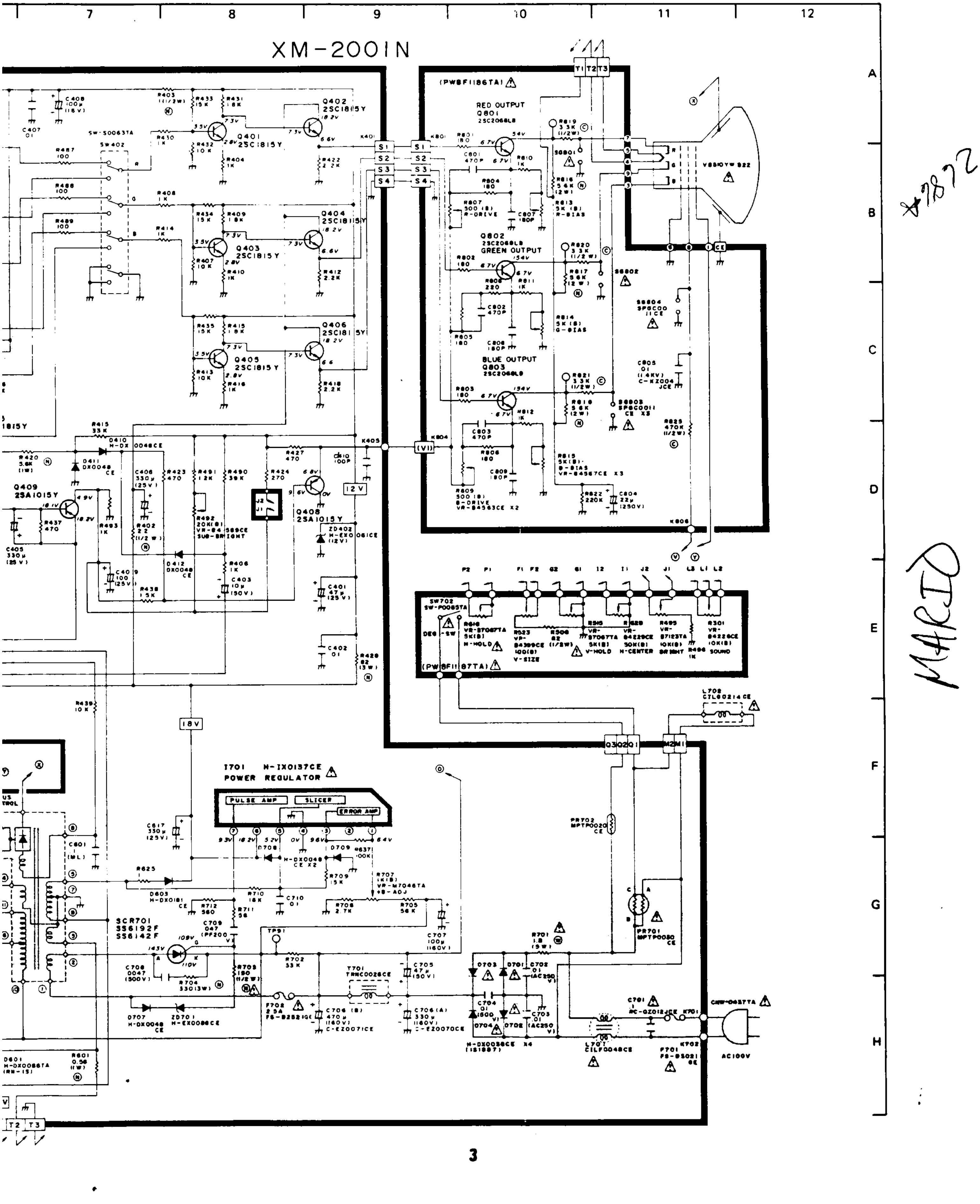
VII MDS P.C. BOARD SCHEMATICS




SCHEMATIC
DATE 3-9-84
Power Supply PP-1200A
Nintendo of America Inc.
DC OUT
1 GND
2 GND
3 GND
4 +12V
5 +12V
6 +5V
7 +5V
8
9 +24V
AC IN 100V
FUSE 3A 125V
C1 0.047μF 630V
L1 SC2A
C2, C3 2200pF 2KV
C4 0.047μF 630V
D1 RB404 OR S4VB40
Q1 5P2M
R1 5.1Ω 5W
C5 330μF 200V
R3 100KΩ 1/2W
C7 4.7μF 50V
R6 1KΩ 1/4W
PC1 S22MD1U (TLP541G)
R8 27KΩ 1/4W
Q2 2SC2562
R10 30Ω 5W
D6 1S1835
D7 1S1835
R9 100Ω 1/4W
C8 47μF 35V
R12 100Ω 1/4W
* R7 47KΩ (PC1: S22MD1L) 10KΩ (PC1: TLP541G)
IC1 3D-3000
C6 0.01μF 50V
R4 1KΩ 1/4W
R5 100Ω 1/2W
D3 1S954
R14 100KΩ 1/2W
C10 0.22μF 250V
D10 1S1835
Q3 2SC2749 2SC2938
R11 10Ω 1/4W
R15 1KΩ 1/4W
D14 1S1835
R16 100Ω 5W
C11 2200pF 2KV
TR 3D-0173
C13 0.1μF 50V
VR1 50KΩ
R17 27KΩ 1/4W
C12 1000pF 50V
PC2 1/2 PC614
D11 30DF2
R19 5.6Ω 1/2W
C15 2200pF 2KV
C16 1000μF 50V
IC2 78M24
C17 47μF 35V
R20 510Ω 5W
D15 30DF2
R18 5.6Ω 1/2W
C14 2200pF 2KV
C24 1000μF 50V
IC4
C25 100μF 25V
R13 820Ω 1/2W
R21 5.6Ω 1/2W
C18 2200pF 2KV
D12 C25P04Q 20CS04M CTB-335
R22 20Ω 5W
C19 ~ C23 3300μF 10V
L2 SF-C27-00105-01
F.G.
C28 0.22μF 250V
C29 0.22μF 250V
ZD1 RD5.1EB3
PC1 1/2
R23 100Ω 1/4W
IC3 TL431 CLP
R24 100Ω 1/4W
PC2 1/2
C26 0.047μF 50V
C27 0.01μF 50V
R26 2.7KΩ 1/4W
VR2 2KΩ +5V Adj.
R25 1.8KΩ 1/4W

XM-2001N SCHEMATIC DIAGRAM




XM-2001N
(PWBF1186TA)
RED OUTPUT
Q801
2SC2068LB
GREEN OUTPUT
Q802
BLUE OUTPUT
Q803
Q401 2SC1815Y
Q402 2SC1815Y
Q403 2SC1815Y
Q404 2SC1815Y
Q405 2SC1815Y
Q406 2SC1815Y
Q408 2SA1015Y
Q409 2SA1015Y
SW402
SW702
SW-P0065TA
(PWBF1187TA)
I701 H-IX0137CE
POWER REGULATOR
PULSE AMP
SLICER
ERROR AMP
SCR701
SS6192F
SS6142F
T701 TRNC0026CE
PR701 MPTP0080CE
PR702 MPTP0020CE
L702 CTLE0214CE
L707 CILF0048CE
F701 FS-B5021CE
F702 2.5A FS-B2521CE
CHW-0657TA
AC100V
V-HOLD
H-CENTER
BRIGHT
SOUND
V-SIZE
H-HOLD
SUB-BRIGHT
R-DRIVE
B-DRIVE
R-BIAS
G-BIAS
B-BIAS
12V
18V

X. PARTS LISTS

A. Body Parts — See Figure 9

ITEM	PART No.	DESCRIPTION
1	MDSA-01-01	Body
2	MDSA-01-71	Top Center Trim
3	MDSU-01-56R	Top Trim (Right)
4	MDSU-01-56L	Top Trim (Left)
5	TKGU-01-29	Fluorescent Lamp Ass'y
6	TKGU-01-29-01	Fluorescent Lamp
	TKGU-01-29-02	Lamp Starter (Glow Lamp)
7	*TENU-01-24-R (Tennis only)	Name Plate with Overlay (Right)
	*TENU-01-24-01R (Tennis only)	Name Plate Overlay (Right)
	MDSA-01-24-02	Name Plate Glass
	*TENU-01-24-L (Tennis only)	Name Plate with Overlay (Left)
	*TENU-01-24-01L (Tennis only)	Name Plate Overlay (Left)
8	MDSU-01-49-R	Speaker Grill (Right)
	MDSU-01-49-L	Speaker Grill (Left)
	TPPU-01-52	Monitor Support Bar
	MDSA-01-50	Center Monitor Mounting Bracket (Left)
9	MDSA-01-51	Center Monitor Mounting Bracket (Right)
	MDSA-01-53	Outer Monitor Bracket (Left)
10	MDSA-01-54	Outer Monitor Bracket (Right)
11	TKGU-20-00R	Video Monitor (20-5F) (Right) (Inverted Scan)
	TKGU-20-00L	Video Monitor (20-5F) (Left) (Standard Scan)
	TKGU-20-01	Video Picture Tube
12	MDSU-01-67	062 Monitor Front Cardboard
13	MDSU-01-68	062 Monitor Side Cardboard
	MDSA-01-23	Front Screen
14	MDSA-23-60R	Complete Operation Panel Ass'y (Right)
	MDSA-23-60L	Complete Operation Panel Ass'y (Left)
15	MDSA-01-73	Control Panel Center Piece
16	*TENU-11-14 (Tennis only)	Instruction Label
17	TKGU-01-31	Draw Latch
18	TMAU-14-17	Service Door ADD-S2 Only
19	TMAU-14-18	Coin Selector AD-81P
20	TMAU-34-16	Lamp Socket BA-9S
21	TMAU-34-17	Lamp BA-9S 6.3V 0.15A
	TMAU-11-21	Cam Tamper Protection Plate
	TMAU-34-19	Micro Switch ADD D2MC-5F1
22	TMAU-14-12	Service Door Lock
23	TMAU-11-14	Cam B 31R
24	TMAU-14-11	Cash Door ADD
25	TMAU-14-12	Cash Door Lock
26	TMAU-11-27	Cash Box ADD
27	MDSU-01-32	CS Frame 120 W Ass'y

*Note: These parts will change from game type to game type.

A. Body Parts, continued — See Figure 9

ITEM	PART No.	DESCRIPTION
28	TKGU-01-11	Game Counter
29	TKGU-01-33	Service Switch
	TMAU-11-20	CS Plate 120W (Only)
	MDSA-01-72	T-Molding (Black)
30	MDSA-01-52	Monitor Bracket

A. Body Parts, continued — See Figure 10

ITEM	PART No.	DESCRIPTION
1	TKGU-01-61	Vent Grill
2	MDSA-01-01-05	Back Door
3	TKGU-01-03	Back Door Lock (Key#6510)
	TKGU-01-03-01	Back Door Key Only (Key#6510)
4	TKGU-01-05	Cam A-Type (Back Door Lock)
5	MDST-21-11	P.C. Board Ass'y (Specify Game Type)
6	MDSU-01-01-11	062 FCC Shield Cover
7	MDSU-01-01-12	062 44P FCC P.C.B. Ass'y
8	MDSU-01-01-13	062 36P FCC P.C.B. Ass'y
9	MDSU-23-35	Snap In Fastener
	TPPU-01-01-14	FCC Sponge (Black)
	CHPU-01-01-15	Shield Cover Label
10	TKGU-01-08	Power Cord 5M
11	TKGU-01-10	Strain Relief Bushing
12	TKGU-01-65	Strain Relief Bushing Plate
	TKGU-11-08	Fuse 5A 125V
13	TKGU-01-30	Caster
14	CHPU-01-01-10	Shield Cage (054 Type)
15	MDSU-08-00	Power Supply (PP-1200A)
16	CHPU-08-01	Power Transformer (PT-1021A)
16	CHPU-18-01	Power Transformer (PT-1021B)
	CHPU-11-12	Power Transformer Bracket 100
	CHPU-11-13	Power Transformer Bracket 120
	TKGU-01-43	Speaker (16 cm)
	TKGU-01-07	Back Door Lock Stopper Plate
	MDSA-11-05	MDS-UP Back Door Label
	TPPU-11-25	FCC Label
	TKGU-11-17	Monitor Adjustment Label
	MDSU-20-09	Monitor Frame
	MDSU-23-61	MDS Manual & Schematics
	TENU-11-01	VS. Tennis Manual

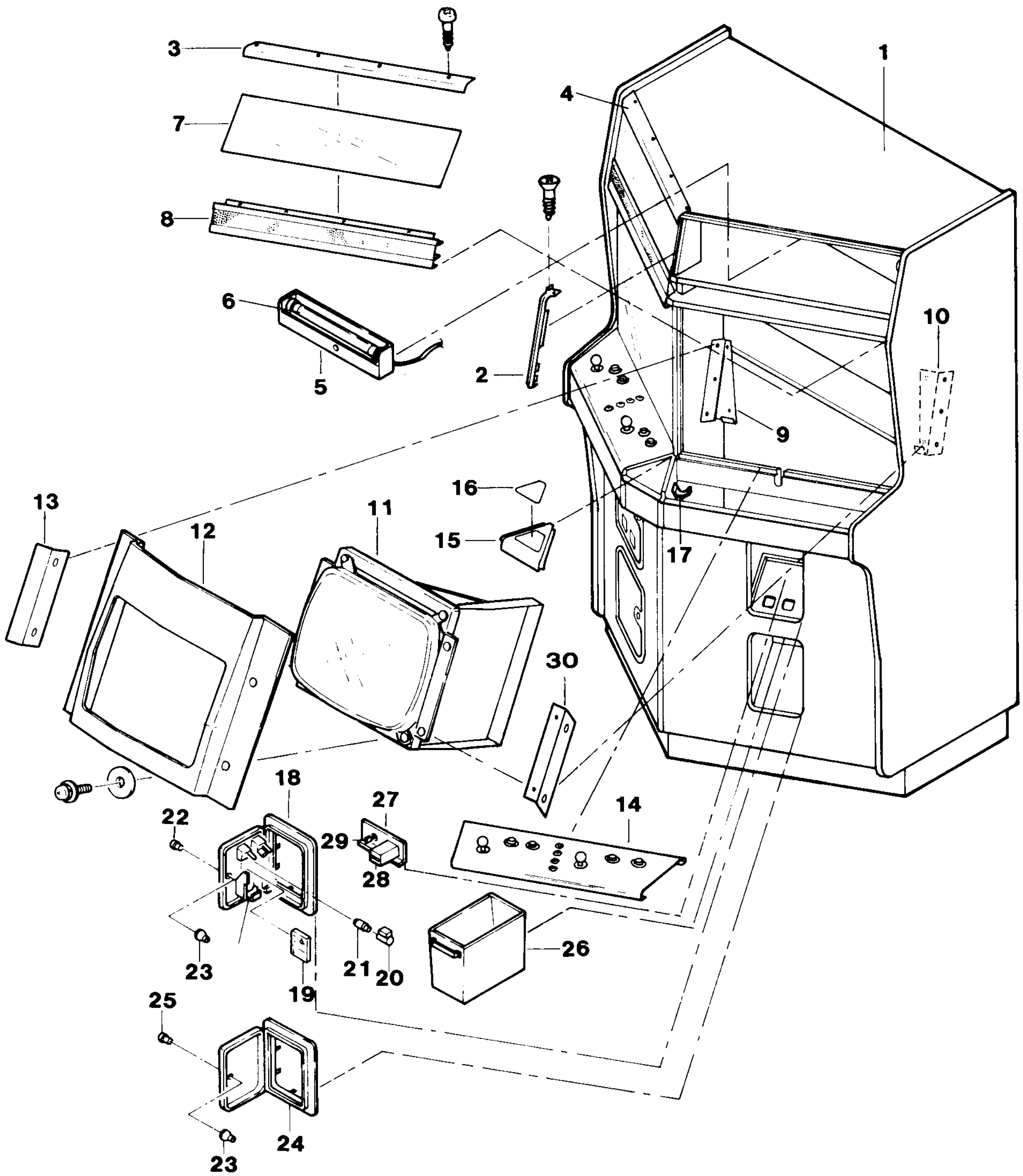

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Fig. 9

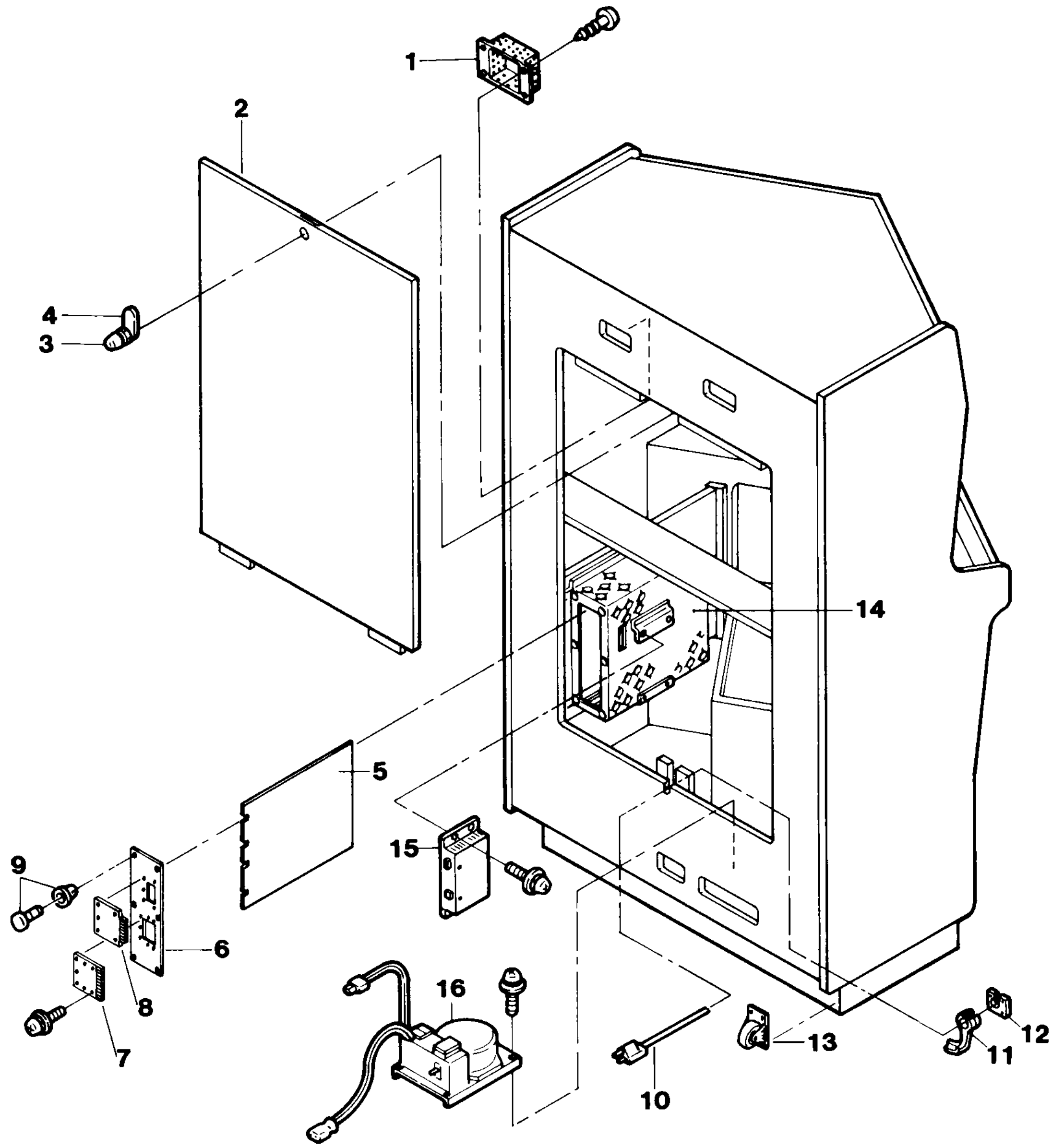


Fig. 10

B. Control Panel Assembly — See Figure 11

ITEM	PART No.	DESCRIPTION
1	MDST-14-12	8 Way Control Level Assembly
2	TKGU-23-21	Switch Collar
3	TNX-23-18	8 Way Guide Plate
4	TKGU-23-17	Switch Spacer
5	TKGU-23-16	Bearing Braker
6	TKGU-23-20	Spring Stopper
7	TKGU-23-22	Lever Spring
8	TKGU-23-23	E-Ring
9	TKGU-23-13	Micro Switch
10	TMAU-12-15	Lever Plate
11	TMAU-12-14	Control Knob Plate
12	TMAU-12-16	Control Knob Collar 8L
13	TMAU-11-18	Knob with Shaft 80.5L
15	MDSA-01-22R	Control Panel Base (Right)
15	MDSA-01-22L	Control Panel Base (Left)
16	TKGU-23-12	Switch Button Bracket
17	TMAU-34-18	Micro Switch VL12L (Straight)
18	MDSU-12-17	Black Sponge, 2 x 10 x 580L
19	TKGU-23-26	Nut Plate
20	TKGU-23-34	Pal Nut M16
21	MDST-12-21	Button Assembly (Black)
22	MDST-12-17	Button Assembly (Crimson)
23	MDSA-23-29	Switch Collar
24	MDSA-23-30	Switch Bezel
25	MDSA-23-31	Switch P163 C3RU
26	TMAU-11-19	Operation Panel Fastener B 38 W
27	TMAU-12-18	Collar — 34 x 28 x 7H

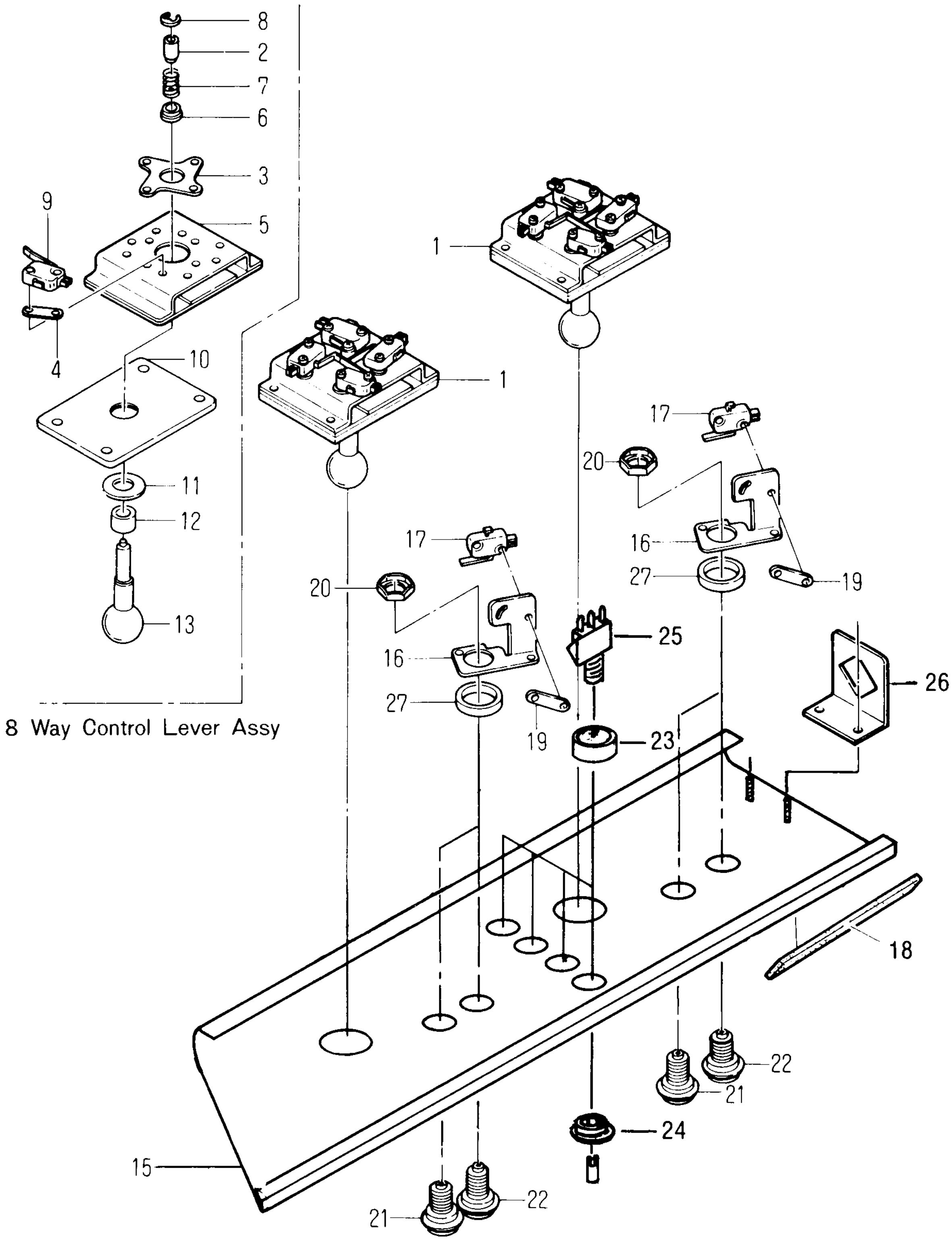

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8 Way Control Lever Assy

Fig. 11

C. Wiring Harnesses

PART No.	DESCRIPTION
MDSU-41-12	062 44P FCC Harness
MDSU-41-11	062 36P FCC Harness
MDST-41-13	UP 062 44P Edge Harness
MDST-41-14	UP 062 36P Edge Harness
MDST-41-11	UP 062 15P SW. Harness
MDST-41-12	UP 062 12P SW. Harness
TPPU-93-02	2P-400 Audio Harness (400 mm)
TPPU-93-07	6P-600 Video Harness (600 mm)
TMAU-41-14	4P-600 WL Coin Harness (600 mm)
TMAU-41-13	4P-800 Service Switch Harness (800 mm)
TMAU-41-12	3P-500 Game Counter Harness (500 mm)
TKGU-13-17	2P-860 Speaker Harness (860 mm)
MDSU-42-01	062 Grounding Ribbon 720L
MDSU-42-02	062 Grounding Ribbon 620L
MDSU-42-03	062 Grounding Ribbon 1320L
MDSU-42-04	062 Grounding Ribbon 1420L
MDSU-42-05	062 Grounding Ribbon 180L
MDSU-42-06	062 Grounding Ribbon 1600L
MDSU-42-07	062 Grounding Ribbon 530L
MDSU-42-08	062 Grounding Ribbon 840L
MDSU-42-09	062 Grounding Ribbon 1700L

D. MDS P.C. Board Assembly

PART No.	DESCRIPTION (Reference Designations and Locations)
MDST-21-11	P.C. Board Assembly
MDST-21-12	2A03 Microprocessor (2J,8J)
MDST-21-13	HM6116 2k×8bit Static RAM, 250ns (1E, 6E)
MDST-21-14	MB8416-15 2k×8bit Static CMOS RAM 150ns (8L)
MDST-21-15	TC5533P-A 4k×8bit Static RAM (2C)
MDST-21-16	TC5533P-B 4k×8bit Static RAM (8C)
MDST-21-17	74LS00 Quad 2-input NAND LS TTL (4C, 5C)
MDST-21-18	74LS04 Hex Inverters LS TTL (1L, 2K, 4E, 5E)
MDST-21-19	74LS10 Tri 3-input NAND LS TTL (4D)
MDST-21-20	74LS32 Hex 2-input AND LS TTL (4A, 4B, 5A, 5B)
MDST-21-21	74LS74 Dual D-Flip Flops LS TTL (5D)
MDST-21-22	74LS123 Dual Retriggable Single Shots LS TTL (1J)
MDST-21-23	74LS138 Dual 2 to 4 Demultiplexers LS TTL (1F, 6F)
MDST-21-24	74LS157 2 to 1 Data Selectors LS TTL (5J, 5K, 6J, 6K)
MDST-21-25	74LS165 8bit Shift register LS TTL (6M, 6N, 7P, 8P)
MDST-21-26	74LS240 Octal 3 State Bus Inverters LS TTL (7M, 7N, 8M, 8N)
MDST-21-27	74LS245 Octal 3 State Bus Tranceivers LS TTL (3K, 8K)
MDST-21-28	74LS373 Octal 3 State D-Latchs LS TTL (2E, 8E)
MDST-21-29	74F04 Hex Inverters FAST TTL (5H)
MDST-21-30	4066 Quad Analog Switches C-MOS (2P, 4P)
MDST-21-31	LM324 Hex Operational Amplifiers (1P, 3P)
MDST-21-32	LM3900 Hex Operational Amplifiers (5N, 5R)
MDST-21-33	PST518A Reset IC (1K)
MDST-21-34	2SA933 Silicon PNP Transistor (Q3, Q7, Q13～Q16, Q19～Q22, Q26, Q27)
MDST-21-35	2SC1740 Silicon NPN Transistor (Q1, Q2, Q4～Q6, Q8, Q9, Q12, Q17, Q18,Q23～Q25)
MDST-21-36	2SD592 Silicon NPN Transistor (Q10, Q11)
MDST-21-37	1S953 Silicon Switching Diode (D1, D2, D5, D7, D9～D11)
MDST-21-38	W03B Silicon Diode (D3, D4, D6, D8)
MDST-21-39	27Ω 1/4W ±5% Resistor (R4)
MDST-21-40	33Ω 1/4W ±5% Resistor (R22, R30, R36, R38, R45～R47, R72, R89)
MDST-21-41	100Ω 1/4W ±5% Resistor (R79, R80, R95, R97)
MDST-21-42	330Ω 1/4W ±5% Resistor (R8, R20, R28, R29, R48, R49, R70, R71, R73, R91)
MDST-21-43	680Ω 1/4W ±5% Resistor (R119)
MDST-21-44	1KΩ 1/4W ±5% Resistor (R31, R32, R92, R93)
MDST-21-45	1.2KΩ 1/4W ±5% Resistor (R37, R43)
MDST-21-46	2.2KΩ 1/4W ±5% Resistor (R6, R11, R12, R14, R15, R23, R24, R27, R39～R42, R50, R51, R54, R55, R64, R65, R68, R69, R81, R87)
MDST-21-47	3.3KΩ 1/4W ±5% Resistor (R77)
MDST-21-48	4.7KΩ 1/4W ±5% Resistor (R13, R17, R25, R26, R52, R53, R66, R67)

D. MDS P.C. Board Assembly (continued)

PART No.	DESCRIPTION (Reference Designations and Locations)	
MDST-21-49	10KΩ 1/4W ±5% Resistor (R3, R5, R7, R16, R18, R19, R21, R33, R56~R63, R75, R82, R83, R85, R86, R120)	
MDST-21-50	12KΩ 1/4W ±5% Resistor	(R76, R96, R98)
MDST-21-51	20KΩ 1/4W ±5% Resistor	(R94, R99)
MDST-21-52	33KΩ 1/4W ±5% Resistor	(R1, R2)
MDST-21-53	100KΩ 1/4W ±5% Resistor	(R10, R35, R84, R103, R121)
MDST-21-54	150KΩ 1/4W ±5% Resistor	(R74, R118)
MDST-21-55	360KΩ 1/4W ±5% Resistor	(R107, R114)
MDST-21-56	750KΩ 1/4W ±5% Resistor	(R101, R108, R109, R110, R115, R116)
MDST-21-57	1MΩ 1/4W ±5% Resistor	(R102, R106, R112, R117)
MDST-21-58	1.8MΩ 1/4W ±5% Resistor	(R90, R105)
MDST-21-59	2.2MΩ 1/4W ±5% Resistor	(R81, R87, R100, R104)
MDST-21-60	1KΩ×8 Series Resistor Array	(RM1, RM2, RM5, RM8, RM11, RM14, RM17)
MDST-21-61	68Ω×4 Parallel Resistor Array	(RM3, RM4, RM6, RM7, RM9, RM10, RM12, RM13, RM15, RM16)
MDST-21-62	33pF 50V Ceramic Disc Capacitor	(C35, C91, C92)
MDST-21-63	68pF 50V Ceramic Disc Capacitor	(C25, C86)
MDST-21-64	100pF 50V Ceramic Disc Capacitor	(C38, C42, C43, C46)
MDST-21-65	220pF 50V Ceramic Disc Capacitor	(C26~29, C34, C45)
MDST-21-66	0.01μF 50V Ceramic Disc Capacitor	(C9, C10, C89, C90)
MDST-21-67	0.1μF 25V Ceramic Disc Capacitor	(C100~C178)
MDST-21-68	0.2μF 12V Ceramic Disc Capacitor	(C4, C12)
MDST-21-69	0.047μF 50V Film Capacitor	(C37, C39, C40, C44)
MDST-21-70	3.3μF 16V Al. Electrolytic Capacitor	(C15~C18, C31, C32)
MDST-21-71	10μF 16V Al. Electrolytic Capacitor	(C3, C5, C6, C11, C13, C14, C19~C24, C30, C33, C36, C41, C47~C85)
MDST-21-72	47μF 16V Al. Electrolytic Capacitor	(C2)
MDST-21-73	100μF 16V Al. Electrolytic Capacitor	(C1)
MDST-21-74	100μF 25V Al. Electrolytic Capacitor	(C8)
MDST-21-75	470μF 16V Al. Electrolytic Capacitor	(C7, C87, C88)
MDST-21-76	500Ω Variable Resistor. Red Cap	(VR1, VR3)
MDST-21-77	500Ω Variable Resistor. Green Cap	(VR2, VR4)
MDST-21-78	500Ω Variable Resistor. Blue Cap	(VR5, VR6)
MDST-21-79	21.47727MHz Crystal	(X1)
MDST-21-80	8 position dip switch	(SW1, SW2)
MDST-21-81	28P IC socket	(1A, 1B, 1C, 1D, 2A, 6A, 6B, 6C, 6D, 8A, 8B)
MDST-21-82	40P IC socket	(2F, 2J, 8F, 8J)
MDST-21-83	Type 32-4 (UM3×2) Battery Case	
MDST-21-84	Bolt with washer M2.6	
MDST-21-85	Flat washer M2.6	
MDST-21-86	Nut Plate M2.6	
MDST-21-87	Dry Battery "AA"	
	T18L Beaded tie	

E. Power Supply

PART No.	DESCRIPTION
MDSU-08-00	Power Supply Unit (PP-1200A)
MDSU-08-01	Transistor 2SC2562 or 2SC3239 (Q2)
MDSU-08-02	Transistor 2SC2749 or 2SC2938 (Q3)
MDSU-08-03	Photo Coupler* (S22MD1V) or (TLP541G) (PC1)
MDSU-08-04	Photo Coupler (PC614) (PC2)
MDSU-08-05	Hybrid IC (3D-3000) (IC1)
MDSU-08-06	IC (MPC78M24) (IC2)
MDSU-08-07	IC (TL431CLP) (IC3)
MDSU-08-08	IC (MPC78M12) (IC4)
MDSU-08-09	Transformer (3D-0173) (TR)
MDSU-08-10	Choke Coil SC2A (L1)
MDSU-08-11	Choke Coil SF-C27-00105-01 (L2)
MDSU-08-12	Fuse Holder 0G751-0062
MDSU-08-13	Fuse 3A 125V
MDSU-08-14	Resistor 5.1 OHM 5W (Cement) (R1)
MDSU-08-15	Resistor 30 OHM 5W (Cement) (R10)
MDSU-08-16	Resistor 100 OHM 5W (Cement) (R16)
MDSU-08-17	Resistor 510 OHM 5W (Cement) (R20)
MDSU-08-18	Resistor 20 OHM 5W (Cement) (R22)
MDSU-08-19	Resistor (carbon) 100 KOHM ½W (R3, 14)
MDSU-08-20	Resistor (carbon) 100 OHM ½W (R5)
MDSU-08-21	Resistor (carbon) 5.6 OHM ½W (R18, 19, 21)
MDSU-08-22	Resistor (carbon) 820 OHM ½W (R13)
MDSU-08-23	Resistor (carbon) 1 KOHM ¼W (R4, 6, 15)
MDSU-08-24	Resistor* (carbon) 47 KOHM or 10 KOHM ¼W (R7)
MDSU-08-25	Resistor (carbon) 27 KOHM ¼W (R8, 17)
MDSU-08-26	Resistor (carbon) 100 OHM ¼W (R9, 11, 12, 23, 24)
MDSU-08-27	Resistor (carbon) 1.8 KOHM ¼W (R25)
MDSU-08-28	Resistor (carbon) 2.7 KOHM ¼W (R26)
MDSU-08-29	Variable Resistor 50 KOHM (VR1)
MDSU-08-30	Variable Resistor 2 KOHM (VR2)
MDSU-08-31	Film Capacitor 0.047MF 630V (C1,4)
MDSU-08-32	Film Capacitor 0.22MF 250V (C10, 28, 29)
MDSU-08-33	Ceramic Capacitor 2200PF 2KV (C2, 3, 11, 14, 15, 18)
MDSU-08-34	Electro Capacitor 330MF 200V (C5)
MDSU-08-35	Electro Capacitor 100MF 50V (C16, 24)
MDSU-08-36	Electro Capacitor 4.7MF 50V (C7)
MDSU-08-37	Electro Capacitor 47MF 35V (C8, 17)
MDSU-08-38	Electro Capacitor 100MF 25V (C25)
MDSU-08-39	Electro Capacitor 3300MF 10V (C19, 20, 21, 22, 23)
MDSU-08-40	Mylar Capacitor 1000PF 50V (C12)
MDSU-08-41	Mylar Capacitor 0.01MF 50V (C6, 9, 27)
MDSU-08-42	Mylar Capacitor 0.1MF 50V (C13)

*Note: The 522MDIV uses R7 of 47 KOHM and the TLP541G uses R7 of 10 KOHM.

E. Power Supply (continued)

PART No.	DESCRIPTION
MDSU-08-43	Mylar Capacitor 0.047MF 50V (C26)
MDSU-08-44	Bridge Rectifier S4V840 (D1)
MDSU-08-45	Diode 1S954 (D3)
MDSU-08-46	Diode 1S1835 (D6, 7, 10, 14)
MDSU-08-47	Diode 30DF2 (D11, 15)
MDSU-08-48	Diode CTB-33S (D12)
MDSU-08-49	Zener Diode RD 5.1EB3 (ZD1, 5.1 Volt)
MDSU-08-50	Thyristor 5P2M (Q1)
MDSU-08-51	Connector 1 (CON1)
MDSU-08-52	Connector 2 (CON2)

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